

## Description of Additional Supplementary Files

File name: Supplementary Data 1

Description: Exact values of data points (at current density  $50 \mu\text{A}/\text{cm}^2$ ) in Fig. 2a.

File name: Supplementary Data 2

Description: Exact values of data points (at current density  $5 \text{ mA}/\text{cm}^2$ ) in Fig. 2a.

File name: Supplementary Data 3

Description: Exact values of data points (at current density  $10 \text{ mA}/\text{cm}^2$ ) in Fig. 2a.

File name: Supplementary Data 4

Description: Exact values of data points (at current density  $15 \text{ mA}/\text{cm}^2$ ) in Fig. 2a.

File name: Supplementary Data 5

Description: Exact values of data points (at current density  $20 \text{ mA}/\text{cm}^2$ ) in Fig. 2a.

File name: Supplementary Data 6

Description: Screened oxide perovskites. The new oxide perovskites are listed in the sequence of  $\mu/\text{t}$ . In the table, as a typical example,

‘Cs+0.5La3+0.5Mn3+0.25Mn4+0Fe3+0.75Fe4+0Co3+0Co4+0Ni3+0Ni4+1.0’  
means ‘Cs<sup>+</sup><sub>0.5</sub>La<sup>3+</sup><sub>0.5</sub>Mn<sup>3+</sup><sub>0.25</sub>Mn<sup>4+</sup><sub>0</sub>Fe<sup>3+</sup><sub>0.75</sub>Fe<sup>4+</sup><sub>0</sub>Co<sup>3+</sup><sub>0</sub>Co<sup>4+</sup><sub>0</sub>Ni<sup>3+</sup><sub>0</sub>Ni<sup>4+</sup><sub>1.0</sub>O<sub>3</sub>’

File name: Supplementary Data 7

Description: The ionic and compositional data used for screening of new oxide perovskites. The table shows examples of the construction of twenty-three perovskite oxides.